2018 Update of the Water and Wastewater Impact Fees of the City of San Marcos

Prepared for:

THE CITY OF SAN MARCOS

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1.0 Introduction and Summary

The City of San Marcos (City) is in the process of updating its water and wastewater impact fees to keep the fee current with its service area and updated CIP information. This report presents HDR Engineering, Inc.'s (HDR) maximum impact fee determination for consideration by the City's Capital Improvements Advisory Committee and the San Marcos City Council.

The methodology to determine the maximum fee amount considers two options. Consistent with State law, each fee component is calculated with either: (1) consideration of a credit for other methods of payments for utility capital by a new customer, such as through utility rates or taxes, or alternatively, (2) a reduction of the maximum fee amount equal to 50% of the unit capital cost of providing new service. By maximum amounts, this means that the determined fee amount was calculated as the highest that can be lawfully levied by the City, given the prospective land uses and capital improvements plan, the cost of existing and new utility capacity, and consideration of a credit to new customers for capital contributions made through rate payments. The City Council can decide to enact fees less than the maximum amounts shown in this report.

As detailed later in this report, the maximum impact fees were developed in component pieces. For instance, the overall water fee is comprised of separate amounts for water supply, treatment, pumping, elevated storage, ground storage, and transmission. This will facilitate the consideration of offsets or credits from the applicable fee if a developer builds and dedicates eligible facilities to the City or the City provides wholesale service to a neighboring utility and wishes to charge only certain portions of the fee. The maximum fee amounts do not include capital costs for facilities required to be provided by developers at their own expense.

Planning, service demand, and design factor assumptions used in the water and wastewater facility sizing and costing were provided by the City. Data on current utility demand, existing utility assets, needed future facilities, outstanding utility debt, and prospective cash versus debt financing were obtained from or coordinated with the City of San Marcos staff. HDR combined these elements into the maximum impact fee calculations presented in this report.

2.0 Utility Service and Fee Application Area

The City's water CCN boundary is the anticipated 10-year future water service area (shown in light blue in Figure 1) in which existing and projected land uses for the water utility, water utility demands, and water utility capital improvements needs were assessed. Likewise, the City's wastewater CCN boundary is the anticipated 10-year future wastewater service area (shown in light green in Figure 2) in which existing and projected land uses for the wastewater utility, wastewater utility demands, and wastewater utility capital improvements needs were assessed.

Areas located within the City of San Marcos water and wastewater CCN's would be the locations in which the City may levy the impact fees, in-part or in-full, if City service is provided. These boundaries does not, however, imply a legal obligation of the City to serve beyond its incorporated limits. If the City does not provide service, in-full or in-part, then the impact fees would not apply.

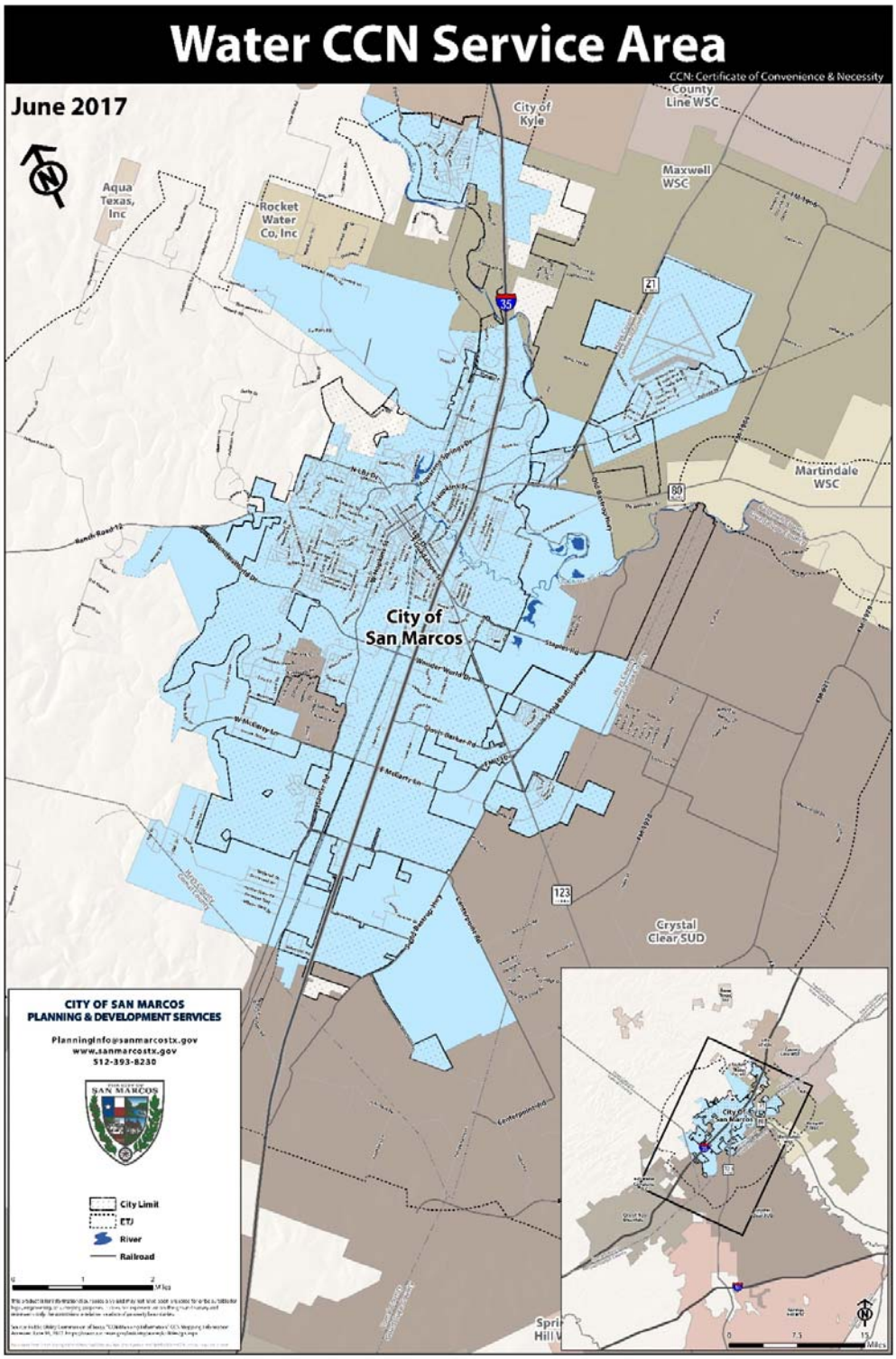

Figure 1. Water Impact Fee Application Area

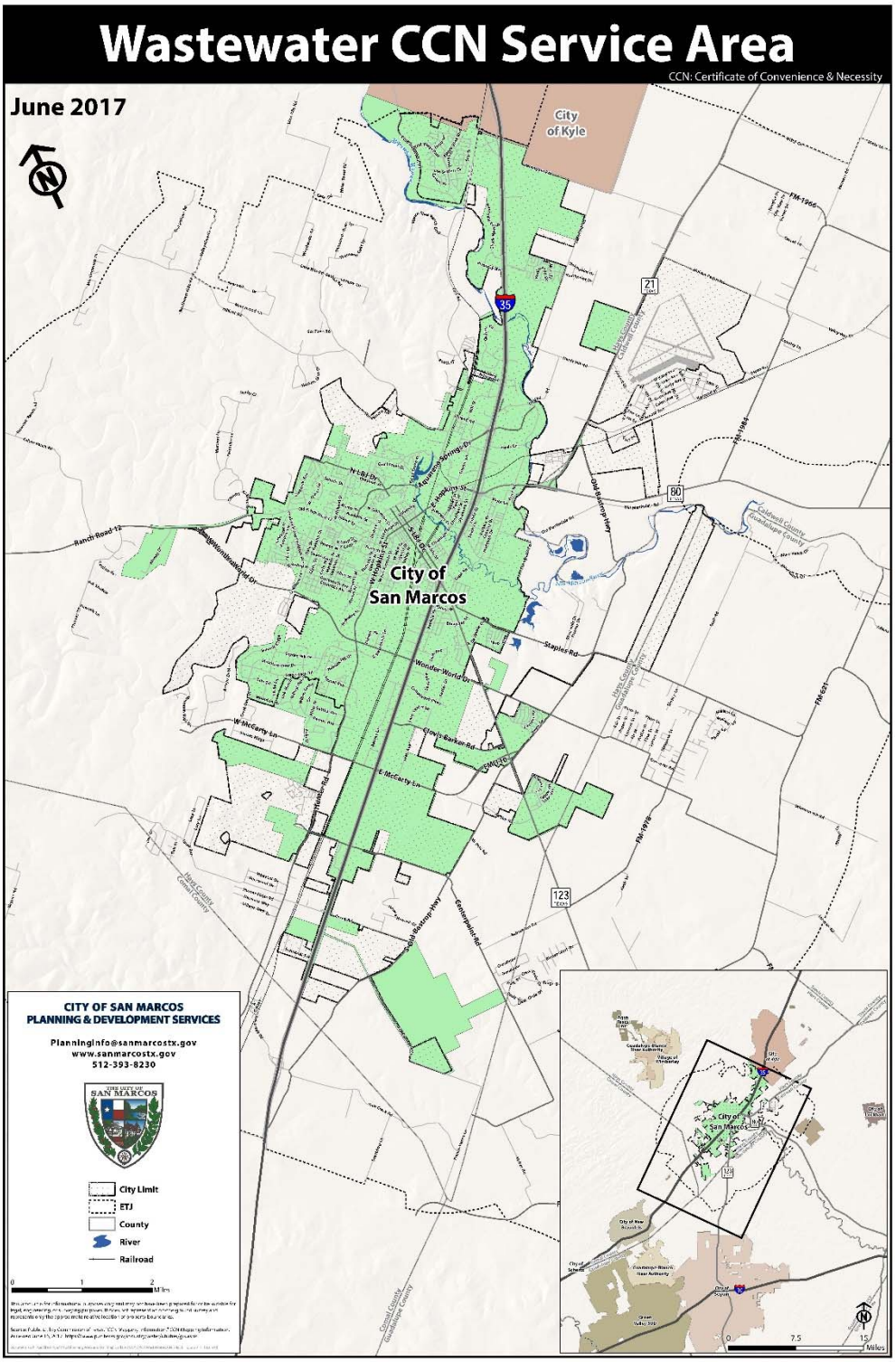

Figure 2. Wastewater Impact Fee Application Area

3.0 Land Use Assumptions

Tables 1a and 1b provides an estimate of the current and future land use patterns of the potential water and wastewater service area with information obtained from the City of San Marcos *Systemwide Use Assumptions for the Implementation of Impact Fees* report (Appendix A). For the water service area, as indicated, about 10.9%% of the total ETJ area is currently in single-family residential land uses with 21.7% in other uses. It is estimated that 67.5% of the land within the planning area is undeveloped.

Table 1a.
Current and Projected Land Use - Water

Item	Current		Future (Including ETJ)	
	Acres	%	Acres	%
Single-Family Residential	6,774	10.9%	8,084	13.0%
Multi-Family Residential	1,977	3.2%	2,356	3.8%
Mixed Use	1,147	1.8%	1,371	2.2%
Commercial	3,481	5.6%	4,156	6.7%
Industrial	1,545	2.5%	1,841	3.0%
Public / Institutional	5,337	8.6%	6,364	10.2%
Undeveloped	42,093	67.5%	38,182	61.2%
Total Land Use Acreage	**62,354**	**100.0%**	**62,354**	**100.0%**

Source: City of San Marcos, 2017.
The following water use rates were used to project demand based on the land use data above:
360 gals per acre – Residential
650 gals per acre – Non-Residential

Over time as the City grows into the planning area, developed land areas will both increase and become a higher percentage of overall land uses. Projected residential land uses are expected to increase to 13.0% of total potential service land area and other land use types are expected to increase to 25.9% of total land use. It is projected that undeveloped land will shrink to 61.2% of the total planning area over the 10-year planning period.

For the wastewater service, as indicated, about 6.7% of the total ETJ area is currently in single-family residential land uses with 13.4% in other uses. It is estimated that 79.9% of the land within the planning area is undeveloped.

Table 1b.
Current and Projected Land Use - Wastewater

Item	Current		Future (Including ETJ)	
	Acres	%	Acres	%
Single-Family Residential	7,563	6.7%	9,026	8.0%
Multi-Family Residential	2,207	2.0%	2,631	2.3%
Mixed Use	1,281	1.1%	1,531	1.4%
Commercial	3,887	3.5%	4,640	4.1%
Industrial	1,725	1.5%	2,055	1.8%
Public / Institutional	5,959	5.3%	7,106	6.3%
Undeveloped	89,684	79.9%	85,317	76.0%
Total Land Use Acreage	**112,306**	**100.0%**	**112,306**	**100.0%**

Source: City of San Marcos, 2017.
The following wastewater use rates were used to project demand based on the land use data above:
165 gals per acre – Residential
265 gals per acre – Non-Residential

Over time as the City grows into the planning area, developed land areas will both increase and become a higher percentage of overall land uses. Projected single-family residential land uses are expected to increase to 8.0% of total potential service land area and other land use is expected to increase to 15.9% of total land use. It is projected that undeveloped land will shrink to 76.0% of the total planning area over the 10-year planning period.

Table 2 shows the current population as well as the projected future population for both the water and wastewater utilities' service area.

Table 2.
Water and Wastewater Service Area Population

Utility	2018	2027	% Increase
Water	68,668	80,486	17.2%
Wastewater	76,671	89,865	17.2%

4.0 Current and Projected Utility Demand and Supply

Table 3 shows the current number of Living Unit Equivalent Units (LUEs) for both the water and wastewater utilities. The number of current water LUEs was developed by Alan Plummer Associates, Inc. The number of LUEs is based on an assessment of the peak use for each customer within the City. This system is being used, instead of using meter size, due to the fact that there has been a concern that the use of meter size is under estimating the impact of multi-family and commercial developments within the City. See Appendix B for a full discussion of the concerns and the new methodology. There were as estimated 15,247 water LUEs within the City in 2017. This number was grown at approximately 1.8% to account for projected growth between 2017 and 2018 to arrive at the starting number of LUEs of 15,518 (See Appendix C). The number of wastewater LUEs was estimated by using the ratio of the water service area population to the wastewater service area population.

Tables 4 and 5 summarize the City's current and projected water and wastewater service demands and existing supply (service) capabilities by facility. Current and future service demands are also compared with the existing service capacity of the utility systems.

Water demand was forecast using population forecasts from the City Planning Department, LUE estimates from the Alan Plummer Associates, Inc., and a dry-year per capita water use statistic used by the City in their water supply and treatment facility planning efforts. Wastewater demand was forecast using historical data and technical studies of the City's system.

Even with the anticipated growth of the City and surrounding area, the City appears to have adequate water and wastewater facilities to meet demands over the next 10 years. However, the City has identified a 10-year CIP for new water and wastewater projects during the period that will be needed to meet demands in certain areas of the water and wastewater service areas.

Table 3.
Water and Wastewater LUEs

Utility	2018	2027	% Increase
Water	15,518	18,189	17.2%
Wastewater	13,966	16,370	17.2%

Table 4.
Estimated Water Service Demands and Available Capacity

Facility Type	*2018*	*2027*	*10-yr Demand Increment*
Supply			
Existing 2018 Capacity (mgd) *	12.2	12.2	
Est. Service Demand	7.3	8.6	1.3
Excess (Deficiency)	4.9	3.6	
Existing 2018 Capacity (LUEs) *	25,835	25,835	
Est. Service Demand	15,518	18,189	2,671
Excess (Deficiency)	10,317	7,646	
Treatment			
Existing 2018 Capacity (mgd)	26.5	26.5	
Est. Service Demand	11.7	13.7	2.0
Excess (Deficiency)	14.8	12.8	
Existing 2018 Capacity (LUEs) *	35,073	35,073	
Est. Service Demand	15,518	18,189	2,671
Excess (Deficiency)	19,555	16,884	
Pumping			
Existing 2018 Capacity (mgd)	25.4	25.4	
Est. Service Demand	11.7	13.7	2.0
Excess (Deficiency)	13.7	11.7	
Existing 2018 Capacity (LUEs) *	33,618	33,618	
Est. Service Demand	15,518	18,189	2,671
Excess (Deficiency)	18,099	15,429	
Ground Storage			
Existing 2018 Capacity (mg)	6.2	6.2	
Est. Service Demand	3.1	3.6	0.5
Excess (Deficiency)	3.1	2.6	
Existing 2018 Capacity (LUEs) *	31,000	31,000	
Est. Service Demand	15,518	18,189	2,671
Excess (Deficiency)	15,482	12,811	
Elevated Storage			
Existing 2018 Capacity (mg)	3.2	3.2	
Est. Service Demand	1.6	1.8	0.2
Excess (Deficiency)	1.6	1.4	
Existing 2018 Capacity (LUEs) *	32,000	32,000	
Est. Service Demand	15,518	18,189	2,671
Excess (Deficiency)	16,482	13,811	
Transmission			
Existing 2018 Capacity (mgd)	72.0	72.0	
Est. Service Demand	17.6	20.6	3.0
Excess (Deficiency)	54.4	51.4	
Existing 2018 Capacity (LUEs) *	63,529	63,529	
Est. Service Demand	15,518	18,189	2,671
Excess (Deficiency)	48,011	45,340	
* Assume LUE conversion factor of :	472	gpd/LUE for wtr supply facilities	
	756	gpd/LUE for treatment	
	756	gpd/LUE for pumping	
	200	gals/LUE for ground storage	
	100	gals/LUE for elevated storage	
	1,133	gpd/LUE for transmission	

Table 5.
Estimated Wastewater Service Demands and Available Capacity

Facility Type	*2018*	*2027*	*10-yr Demand Increment*
Treatment			
Existing 2018 Capacity (mgd) *	9.0	9.0	
Est. Service Demand	5.1	6.0	0.9
Excess (Deficiency)	3.9	3.0	
Existing 2018 Capacity (LUEs) *	24,700	24,700	
Est. Service Demand	13,966	16,370	2,403
Excess (Deficiency)	10,733	8,330	
Pumping			
Existing 2018 Capacity (mgd)	53.9	53.9	
Est. Service Demand**	22.9	26.8	3.9
Excess (Deficiency)	31.0	27.0	
Existing 2018 Capacity (LUEs) *	32,866	32,866	
Est. Service Demand	13,966	16,370	2,403
Excess (Deficiency)	18,899	16,496	
Interceptors			
Existing 2018 Capacity (mgd)	70.0	70.0	
Est. Service Demand	22.9	26.8	3.9
Excess (Deficiency)	47.0	43.1	
Existing 2018 Capacity (LUEs) *	42,660	42,660	
Est. Service Demand	13,966	16,370	2,403
Excess (Deficiency)	28,694	26,290	

* Assume LUE conversion factor of : 364 gpd/LUE for ww treatment
1,640 gpd/LUE for ww pumping
1,640 gpd/LUE for interceptors

** Assumes: 100.0% of ww demand pumped

5.0 Identified Major Capital Improvement Needs and Costs

Given the projected growth in water and wastewater demands, existing capacity, and the modeling of infrastructure needs, various additional facilities have been identified to meet the needs for the next 10 years. The City's 10-year capital need for new capacity totals $101.254 million for water, mostly associated with new supplies from the Alliance Regional Water Authority and new water transmission facilities, and $61.075 million for wastewater (see Appendix D).

Given the growth facing the City in the next ten years, improvements have been identified for the areas of water supply, pumping, elevated storage, and water transmission. San Marcos has also identified needed improvements to its wastewater system, including improvements to the treatment plant, pumping, and wastewater interceptors that would serve future growth.

Specific projects that accomplish these service capacity goals are identified in Tables 6a and 6b along with their cost, capacity, unit cost, and allocation of existing and projected demand to these facilities. A weighted unit cost of service ($ per SU) is then calculated by facility type, based on the proportionate share of use of existing versus new facility capacity by the growth anticipated over the next ten years.

Table 6a.
Water CIP Inventory and Costing

Facility Name	Construction Cost	Capacity Total	Capacity LUEs	Construction Cost per LUE	Facility Capacity Allocations (LUEs): Existing Customers	Growth Use in Next 10 Years	Excess Capacity after 10 Years	Total Capacity
WATER SUPPLY								
EXISTING FACILITIES		mgd						
Existing Supply	$ 17,529,402	12.2	25,835					
Subtotal Existing Facilities	$ 17,529,402	12.2	25,835	$ 679	15,518	1,851	8,466	25,835
FUTURE FACILITIES								
Alliance Regional Water Authority	$ 75,405,000	5.4	11,435					
Subtotal Future Facilities	$ 75,405,000	5.4	11,435	$ 6,594	-	820	10,615	11,435
TOTAL WATER SUPPLY	$ 92,934,402	17.6	37,270		15,518	2,671	19,082	37,270
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 2,495**				
WATER TREATMENT								
EXISTING FACILITIES		mgd						
Existing WTPs	$ 21,368,541	26.5	35,073					
Subtotal Existing Facilities	$ 21,368,541	26.5	35,073	$ 609	15,518	2,671	16,884	35,073
FUTURE FACILITIES								
			-					
Subtotal Future Facilities	$ -	-	-		-	-	-	-
TOTAL WATER TREATMENT	$ 21,368,541	26.5	35,073		15,518	2,671	16,884	35,073
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 609**				
WATER PUMPING								
EXISTING FACILITIES		mgd						
Existing Booster Pump Stations	$ 3,351,399	25.4	33,618					
Subtotal Existing Facilities	$ 3,351,399	25.4	33,618	$ 100	15,518	1,895	16,205	33,618
FUTURE FACILITIES								
Comanche Pump Station Improvements	$ 180,000	2.8	3,706					
SWTP Pump Expansion	$ -	4.7	6,221					
Trunk Hill Pumps	$ 2,500,000	2.3	3,044					
Soyars Storage Tank Pumps	$ 65,000	0.6	847					
Subtotal Future Facilities	$ 2,745,000	10.4	13,818	$ 199	-	776	13,042	13,818
TOTAL WATER PUMPING	$ 6,096,399	35.8	47,435		15,518	2,671	29,246	47,435
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 128**				
GROUND STORAGE		5,000.000						
EXISTING FACILITIES		mg						
Existing GS Tanks	$ 9,240,000	6.2	31,000					
Subtotal Existing Facilities	$ 9,240,000	6.2	31,000	$ 298	15,518	2,671	12,811	31,000
FUTURE FACILITIES								
			-			-		
Subtotal Future Facilities	$ -	-	-	$ -	-	-	-	-
TOTAL GROUND STORAGE	$ 9,240,000	6.2	31,000		15,518	2,671	12,811	31,000
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 298**				
ELEVATED STORAGE								
EXISTING FACILITIES		mg						
Existing ES Tanks	$ 4,852,000	3.2	32,000					
Subtotal Existing Facilities	$ 4,852,000	3.2	32,000	$ 152	15,518	2,035	14,447	32,000
FUTURE FACILITIES								
Trunk Hill Tank	$ 1,790,000	0.5	5,000					
La Cima Tank	$ 215,500	0.5	5,000					
Subtotal Future Facilities	$ 2,005,500	1.000	10,000	$ 201	-	636	9,364	10,000
TOTAL ELEVATED STORAGE	$ 6,857,500	4.200	42,000		15,518	2,671	23,811	42,000
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 163**				
TRANSMISSION								
EXISTING FACILITIES		mgd						
Existing Transmission	$ 27,893,977	72.0	63,529					
Subtotal Existing Facilities	$ 27,893,977	72.0	63,529	$ 439	15,518	1,576	46,435	63,529
FUTURE FACILITIES								
Southeast Improvements	$ 12,065,000	30.2						
Northeast Improvements	$ 4,800,000	5.0						
Central Improvements	$ 3,500,000	10.3						
Southwest Improvements	$ 733,000	4.5						
Subtotal Future Facilities	$ 21,098,000	50.0	44,117	$ 478	-	1,095	43,022	44,117
TOTAL TRANSMISSION	$ 48,991,977	122.0	107,647		15,518	2,671	89,458	107,647
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 455**				
WATER TOTAL	$ 185,488,819							
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 4,149**				

Table 6b.
Wastewater CIP Inventory and Costing

Facility Name	Construction Cost	Capacity Total	Capacity LUEs	Construction Cost per LUE	Facility Capacity Allocations (LUEs) Existing Customers	Growth Use in Next 10 Years	Excess Capacity after 10 Years	Total Capacity
TREATMENT								
EXISTING FACILITIES		mgd						
Existing WWTPs	$ 31,964,891	9.0	24,700					
Subtotal Existing Facilities	$ 31,964,891	9.0	24,700	$ 1,294	13,966	1,664	9,069	24,700
FUTURE FACILITIES								
Existing WWTP 4.0 MGD AADF Expansion	$ 20,500,000	4.0	10,978					
Subtotal Future Facilities	$ 20,500,000	4.0	10,978	$ 1,867	-	739	10,239	10,978
TOTAL WASTEWATER TREATMENT	$ 52,464,891	13.0	35,677		13,966	2,403	19,308	35,677
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 1,470**				
PUMPING								
EXISTING FACILITIES		mgd						
Existing Lift Stations	$ 14,618,933	53.9	32,866					
Subtotal Existing Facilities	$ 14,618,933	53.9	32,866	$ 445	13,966	1,601	17,298	32,866
FUTURE FACILITIES								
Brown Terrace Wastewater Lift Station	$ 50,000	0.5	305					
Hwy 80 Lift Station and Force Main	$ 6,000,000	5.0	3,049					
Trace Lift Station Oversize	$ 3,200,000	3.5	2,135					
Main Lift Station Improvements	$ 6,200,000	9.0	5,489					
Main Lift Station Force Main	$ 4,700,000	9.0	5,489					
Subtotal Future Facilities	$ 20,150,000	27.0	16,466	$ 1,224	-	802	15,664	16,466
TOTAL PUMPING	$ 34,768,933	80.9	49,332		13,966	2,403	32,962	49,332
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 705**				
INTERCEPTORS								
EXISTING FACILITIES		mgd						
Existing Interceptors	$ 21,028,844	70.0	42,660					
Subtotal Existing Facilities	$ 21,028,844	70.0	42,660	$ 493	13,966	1,920	26,773	42,660
FUTURE FACILITIES								
Southeast Improvements	$ 800,000	0.6						
Northeast Improvements	$ 17,400,000	14.3						
Central Improvements	$ 500,000	0.5						
Southwest Improvements	$ 1,725,000	2.3						
Subtotal Future Facilities	$ 20,425,000	17.6	10,734	$ 1,903	-	483	10,251	10,734
TOTAL INTERCEPTORS	$ 41,453,844	87.6	53,394		13,966	2,403	37,024	53,394
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 776**				
WASTEWATER TOTAL	$ 128,687,668							
	AVERAGE CAPITAL COST PER NEW LUE =			**$ 2,950**				

6.0 Consideration of Other Methods of Capital Payment

For utilities that charge an impact fee, the new customer pays for capital in two ways: (1) initially through the up-front impact fee, and (2) over the longer-term through utility rate payments, where typically some portion of customer rate payments also funds capital projects.

The 77th Texas Legislature amended Chapter 395 of the Local Government Code to require either: (1) a calculated credit for rate payments be reflected in the fee amount, or (2) a credit equal to 50% of the total projected cost of the capital improvements plan be given in calculating the maximum fee amount.

Table 7 indicates the estimated cost per LUE that is projected to be borne in the utility rates by the average new customer. The rate credit calculation considered: (1) existing debt, (2) future debt payments incurred in the year in which the facilities would be built and financed, and (3) the projected LUEs at the mid-point year of the weighted average life of the debt for the facilities that are part of the impact fee calculation for each utility.

7.0 Alternative Impact Fee Calculations

Table 8 summarizes the unit capital cost of providing new service and the two alternative credit calculations for new customers. The alternative approach that calculates a specific rate credit (Option A) results in the maximum impact fee calculation of $3,801 per LUE for water and $2,684 per LUE for wastewater, totaling $6,485 per LUE.

As shown in Table 8, the alternative 50% of capital cost method for calculating a rate credit (Option B) results in a lesser water impact fee of $2,085 per LUE and wastewater fee of $1,485 per LUE, yielding an overall fee of $3,570 per LUE.

Table 7.
Existing or Anticipated Debt to be Paid through Utility Rates

Facility Type	*Est. Debt in Rates*	*Mid-Point LUEs*	*Est. Debt in Rates per LUE*
WATER UTILITY			
Supply			
Existing Debt	$ 235,809	16,854	$ 14
Series 2018-2027	3,271,144	16,854	194
Subtotal Water Supply	***3,506,953***		***208***
Treatment			
Existing Debt	166,728	16,854	10
Series 2018-2027	0	16,854	0
Subtotal Water Treatment	***166,728***		***10***
Pumping			
Existing Debt	188,646	16,854	11
Series 2018-2027	119,081	16,854	7
Subtotal Water Pumping	***307,727***		***18***
Ground Storage			
Existing Debt	12,359	16,854	1
Series 2018-2027	0	16,854	0
Subtotal Ground Storage	***12,359***		***1***
Elevated Storage			
Existing Debt	47,852	16,854	3
Series 2018-2027	87,001	16,854	5
Subtotal Elevated Storage	***134,853***		***8***
Transmission			
Existing Debt	995,511	16,854	59
Series 2018-2027	915,252	16,854	54
Subtotal Transmission Lines	***1,910,764***		***113***
Total Water			**$358**
WASTEWATER UTILITY			
Treatment			
Existing Debt	$ 419,741	15,168	$ 28
Series 2018-2027	883,218	15,168	58
Subtotal WWTP	***1,302,959***		***86***
Pumping			
Existing Debt	313,364	15,168	21
Series 2018-2027	868,139	15,168	57
Subtotal Wastewater Pumping	***1,181,503***		***78***
Interceptors			
Existing Debt	828,136	15,168	55
Series 2018-2027	875,679	15,168	58
Subtotal Interceptors	***1,715,392***		***112***
Total Wastewater			**$276**
Total Water and Wastewater			**$634**

Table 8.
Derivation of Alternative Maximum Water and Wastewater Impact Fee Amounts

Item	Capital Cost of New Service per LUE	Optional Adjustments		Option A	Option B	Highest of Option A or B
		Option A Rate Credit	Option B 50% Cost Adjustment			
WATER						
Supply	$ 2,495	$ 208	$ 1,247	$ 2,287	$ 1,247	
Treatment	609	10	305	599	305	
Pumping	128	18	64	110	64	
Ground Storage	298	1	149	297	149	
Elevated Storage	163	8	82	155	82	
Transmission	455	113	228	342	228	
Allocated Impact Fee Study Cost	10			10	10	
Total Water	$4,159	$358	$2,074	$3,801	$2,085	**$3,801**
WASTEWATER						
Treatment	$ 1,470	$ 86	$ 735	$ 1,385	$ 735	
Pumping	705	78	352	627	352	
Interceptors	774	112	387	662	387	
Allocated Impact Fee Study Cost	10			10	10	
Total Wastewater	$2,960	$276	$1,475	$2,684	$1,485	**$2,684**
TOTAL WATER/WASTEWATER	$7,119	$634	$3,549	$6,485	$3,570	**$6,485**

The fee methodology was replicated for each major facility type in the utility system (e.g., supply, treatment, pumping, elevated storage, ground storage, and transmission) so that the total fee amount is the sum of the component facility fees. This provides a basis for extending the fee to wholesale customers of the City or granting fee offsets if a developer cost-participates with the City on CIP projects.

For comparison purposes, the current impact fees of other near-by cities are listed in Table 9.

Table 9.
Area Impact Fee Comparison

City/Utility	*Water*	*Wastewater*	*Total*
New Braunfels	$5,322	$4,081	$9,403
San Antonio	$4,597	$3,306	$7,903
Austin	$5,400	$2,200	$7,600
Buda	$3,595	$3,515	$7,110
Pflugerville	$4,241	$2,725	$6,966
San Marcos – New Maximum	**$3,801**	**$2,684**	**$6,485**
Kyle	$3,535	$2,826	$6,361
Round Rock	$4,025	$2,099	$6,124
San Marcos – Current	**$2,285**	**$3,506**	**$5,791**
Hutto	$3,625	$2,128	$5,753
Leander	$3,880	$1,615	$5,495
Cedar Park	$2,250	$2,000	$4,250
Seguin	$1,875	$2,374	$4,249

8. Advisory Committee Actions and Recommendations

The following summarizes the Capital Improvements Advisory Committee activities during the impact fee updating process:

- On January 23, 2018, the Committee met to:
  - Review population and land use information.
  - Review Chapter 395 Impact Fee process and requirements;
  - Review methodology for maximum fee calculation;
  - Review CIP information;
  - Review unit cost calculations and maximum fee calculation; and
  - Receive draft report for review.
- On February 13, 2018, the Committee met to:
  - Approve the Impact Fee Report. By approving this report the Committee found the following:
    - The land use assumptions used in the report are reasonable;
    - The CIP used in the report is reasonable; and
    - The method used to calculate the maximum impact fee is reasonable.
  - In addition, the Committee recommends to City Council that the maximum impact fee amount in this document be adopted.

Appendix A
Systemwide Land Use
Assumptions for the Implementation of Impact Fees

SYSTEMWIDE LAND USE ASSUMPTIONS FOR THE IMPLEMENTATION OF IMPACT FEES

MARCH, 2017

City of San Marcos, Texas

Chapter 395 of the *Texas Local Government Code (LGC)* outlines the requirements for cities in Texas to implement impact fees for development. The initial step in this process is the formulation of "Land Use Assumptions" for the City upon which the impact fee program will be based.

This report contains the methodology, maps, existing data and projections used as the basis for the City of San Marcos Impact Fees.

Purpose

The purpose of this report is to formulate growth and development projections based upon assumptions pertaining to the type, location, quality and timing of various future land uses within the community. The land use assumptions, derived from the City's Comprehensive Plan, Preferred Scenario Map and population projections, will become the basis for the City's Impact Fees and Capital Improvement Plan. This report will also establish and document the methodology used for preparing the growth and land use assumptions.

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Definitions and Conventions

The following definitions and conventions are meant to assist the reader in better understanding the technical nature of this document.

CCN: Certificate of Convenience and Necessity which is granted under Chapter 13 of the Texas Water Code, by the Texas Commission on Environmental Quality (TCEQ), to allow the holder exclusive rights to provide water and wastewater utility service to a geographically defined area. The City of San Marcos operates a water and wastewater system and holds a CCN for each utility.

Comprehensive Plan: "*Vision San Marcos, A River Runs Through Us*" The plan, adopted in March, 2013, which is designed to guide the future actions of the City by providing Vision, Goal and Objective statements and including a future land use map (the Preferred Scenario)

GIS: Geographic Information System which stores and displays data on maps. For the purposes of this report, Citywide GIS data was gathered in Mid-2016 and Service Area data was gathered in Late-2016.

Growth Rate: The percentage change of a specific variable, Population in the case of this document, for a specific time period.

Land Use: Describes how a property is used, which may vary from its assigned zoning category or proposed future land use. Six land uses are referenced in this document:

1. Single Family Residential – properties used for the dwelling of one family including detached or attached homes and townhomes
2. Multi Family Residential – properties used for the dwelling of multiple families including duplexes, apartments and student housing complexes
3. Mixed Use – properties which have a mixture of residential and commercial uses on one lot.
4. Commercial – properties used to provide services or employment including office, retail, and restaurants.
5. Industrial – properties used for jobs, particularly manufacturing, distribution or the like.
6. Public / Institutional – properties which are typically open to the public or to enhance the public good including city parks, schools and places for religious gatherings

Preferred Scenario Map: A graphic representation of the future growth areas defined by the Comprehensive Plan which provides spatial distribution for the future population and economic growth in and around the City

Service Area: The land area within the City's ETJ which is not served by a CCN other than the San Marcos CCN.

Water and Wastewater Master Plans: Comprehensive studies of the City's water and sewer systems and capacity which is used to guide future utility expansion decisions. The City's water and wastewater master plans were based on 2013 population figures, meanwhile this report is based on 2017 estimates. It is important to note that the City of San Marcos was named the fastest growing city in the United States from 2012-2015 therefore discrepancies may exist between the population data in this report and that which was presented in the Master Plans. Future master plan revisions should consider utilizing updated populations figures to more accurately represent the population of the city at that time.

Benchmark Data

Documenting historical growth trends and base year data provides a benchmark for future land use assumptions. Much of this data exists and is readily available at the City level, however the Service Area Boundaries for Water and Wastewater do not correspond with the City Limits Boundary *(see Appendix Water CCN-2016 and Wastewater CCN-2016)*. City level data is discussed initially below because it is used as a basis for determining the necessary Benchmark Data for each of the service areas. The City level data can be used for comparison and to verify the validity of service area benchmark data.

Population – City Wide

This section documents historic and current year population and residential permit data for the City.

For the purposes of this analysis, the January 1, 2017 City of San Marcos population estimates are used as the base year population. The City's population estimation methodology is the most conservative method and was confirmed as reasonable and accurate by the State Demographer of Texas.

Residential permit data is based on the City of San Marcos, Planning and Development Services Department records for Certificates of Occupancy (CofO) issued in a given year.

The following tables document historical population and permit data and trends.

Table: Historical Population Growth Rate
City of San Marcos, Texas

Year	Population*	% Change
1950	9,980	--
1960	12,713	27.4%
1970	18,860	48.4%
1980	23,420	24.2%
1990	28,743	22.7%
2000	34,733	20.8%
2010	44,894	29.3%
2017	59,338**	32.2%

***Source: US Census Bureau**
****Source: City of San Marcos, January 1, 2017 Population Estimate**

Methodology – Gather decennial US Census Bureau data. Complete annual population estimates per 2015 population estimates methodology

Table: Residential Dwelling Units
City of San Marcos, Texas

Year	New Single Family* Dwelling Units	New Multi-Family** Dwelling Units
2010	153	86
2011	182	854
2012	224	931
2013	245	877
2014	279	1058
2015	238	649
2016	370	367
AVERAGE	242	689

***Includes single family attached and detached dwellings and townhouses**
****Includes duplexes, multifamily and student housing units**

Methodology – Single Family – use Report: Single Family Residential – Subdivision – Update (most recent date)
Multi Family – use per year unit data from Report: Multi Family Excel

Land Use – City Wide

This section provides an understanding of existing conditions within the City. A survey and documentation of existing land use patterns within the City was made by examining known developments, existing zoning, aerial imagery and county tax records. *(see Appendix Water CCN Service Area Land Use, 2016 and Wastewater CCN Service Area Land Use, 2016)* Notes detailing the methodology for gathering GIS Land Use Data is available from the Planning and Development Services Department. *(P:\ Planning Long Range\ Long Range Planning\Impact Fees\2016 Land Use Assumptions\GIS)*

It should be noted that the City of San Marcos has an above average amount of public/institutional land use due to the significant amount of land owned by Texas State University and the City, including the airport and parkland. Future projections of land use will assume the same rate of increase for all land uses; however, this may not accurately reflect how development will ultimately occur.

The following table documents the summary of estimated existing land uses within the City and a calculation of land uses per 100 persons based on the current year population estimate.

Table: Existing Land Use
City of San Marcos, Texas

Land Use Category	Total Acres	Acres Developed	% of Total	Acres per 100 Persons*
Single Family Residential	5,960	3,828	27.2%	10.04
Multifamily Residential	1,737	1,378	7.9%	2.93
Mixed Use	1,011	355	4.6%	1.70
Commercial	3,064	1,724	14.1%	5.16
Industrial	1,357	872	6.2%	2.29
Public / Intuitional	4,692	3,233	21.5%	7.91
Vacant	4,052		18.5%	6.83
TOTAL	**21,872**	**11,389**	**100%**	**36.86**

*** Based on the City of San Marcos, January 1, 2017 Population Estimate of 59,338**

Methodology – Acres Per 100 Persons = (Acres/Population)*100

Population – Service Areas

This section provides an estimation of population for the Water and Wastewater Service Areas.

The 2010 decennial census and Comprehensive Plan (1.78%) growth rate were used as a basis in determining the current year population of each service area. The calculation assumes that the service area will experience similar growth as that of the City due to the conservative nature of the City's population estimation methodology, the location of the City within the service area boundaries and the location of known, future, developments.

The following tables document estimated population data for the Water and Wastewater Service Areas.

Table: Estimated Population
Water Service Area

County	2010 Population*	2017 Population Estimate**
Hays	54,596	61,773
Guadalupe	2,475	2,800
Caldwell	2,558	2,894
TOTAL	**59,629**	**67,468**

***Source: US Census Bureau**
****Source: City of San Marcos, Comprehensive Plan Growth Rate**

Methodology – Determine the decennial census year population by using census blocks which intersect the service areas. Apply the average growth rate from the current year population estimates over the appropriate number of years (Comprehensive Plan Growth Rate = 1.78% applied over 6 years)

Table: Estimated Population
Wastewater Service Area

County	2010 Population*	2017 Population Estimate**
Hays	55,263	62,528
Guadalupe	6,717	7,600
Caldwell	4,598	5,202
TOTAL	**66,578**	**75,330**

***Source: US Census Bureau**
****Source: City of San Marcos, Comprehensive Plan Growth Rate**

Methodology – Determine the decennial census year population by using census blocks which intersect the service areas. Apply the average growth rate from the current year population estimates over the appropriate number of years (Comprehensive Plan Growth Rate = 1.78% applied over 6 years)

Land Use – Service Areas

This section provides an understanding of existing conditions within each Service Area. A survey and documentation of existing land use patterns within the proposed impact fee service area was made by examining known developments, existing zoning, aerial imagery and county tax records. Notes detailing the methodology for gathering GIS Land Use Data is available from the Planning and Development Services Department. *(P:\ Planning Long Range\ Long Range Planning\Impact Fees\2016 Land Use Assumptions\GIS)*

The following table documents the summary of estimated existing land uses within each service area.

Table: Existing Land Use
Per Service Area

Land Use Category	Water Service Area Acres	Wastewater Service Area Acres
Single Family Residential	10,957	15,516
Multifamily Residential	1,722	1,836
Mixed Use	978	1,019
Commercial	3,355	4,043
Industrial	2,925	3,239
Public / Institutional	6,160	7,358
Vacant	36,257	79,295
TOTAL	62,354	112,306

Methodology – Please refer to the GIS Method to Calculate Developed / Vacant Acres for Impact Fee Analysis

Growth Rate Data

Growth can be characterized in two forms: Residential (population) and Nonresidential.

Assumptions for Applying Growth Rates

Several assumptions have been made in order to apply the growth rate to the Water and Wastewater Service Areas:

- Future land uses will occur as shown on the Preferred Scenario Map
- Known or anticipated developments will occur as presently planned
- Densities will be as projected, based upon anticipated zoning districts
- Growth rates occurring outside of the City Limits will be similar to the growth experienced within City Limits
- Residential growth outside of the City Limits will be primarily single family
- The City will be able to grow and serve its proposed impact fee service areas
- The City will have the revenue to finance necessary improvements to the water and wastewater systems to accommodate growth
- School facilities will be sufficient to accommodate the expected increase in school-age population

Establishment of Residential Growth Rates

In prior years, building permit data was used to determine residential population growth using the following calculations:

Average Residential Permits per Year * Occupancy Rate = New Dwellings per Year
New Dwellings per Year * Persons Per Household = Population Added per Year
Population Added per Year * 10 years = Projected Population
This projected population was then distributed over the 10 year time frame and a growth rate was assumed.

More recently, the City has created a methodology for calculating growth rates and projecting future population based on historical data and meetings with the State Demographer. The average growth rate for the seven year period from 2010-2017 is 3.89%. The current growth rate from January 1, 2016-January 1, 2017 is 1.76%. A conservative growth rate of 1.78% was calculated during the Comprehensive Planning process in coordination with the State Demographer and is used for the City's planning processes.

Since the conservative growth rate of 1.78% is typically used for planning purposes, this rate will be the primary rate used to project the population for the Water and Wastewater Service Areas.

Establishment of Growth Rates for all Land Uses

Changes in population affect the use of land. Increased population results in the conversion of vacant or agricultural lands and the additional need for nonresidential uses to accommodate the residential growth. To project nonresidential growth, it is assumed that the future acreage required to support the increased population will be consistent with the acreage of existing uses.

Service Area Projection Data

Residential Projections (Population)

The growth rate calculated during the City's Comprehensive Planning process is 1.78%. Since this conservative growth rate is used for planning purposes and was calculated in coordination with the State Demographer, it will be used to project the population for Water and Wastewater Service Areas. The current year (2016-2017) and average (2010-2017) growth rates have been shown on the tables below for comparison purposes.

The following tables indicate population projections for each of the Service Areas:
(note: for comparison purposes, the 2012 building permit growth rate methodology was calculated and the difference in population was negligible with a 12,000 increase vs. 13,000 increase over 10 years)

Table: Ten-Year Population Projections
Water Service Areas

Year	Water Service Area Conservative Growth 1.78%	Water Service Area Current Year Growth 1.76%	Water Service Area Average Growth 3.89%
2017*	67,468	67,468	67,468
2018	68,668	68,665	70,092
2019	69,891	69,863	72,819
2020	71,135	71,093	75,651
2021	72,401	72,344	78,594
2022	73,690	73,617	81,651
2023	75,001	74,913	84,828
2024	76,336	76,231	88,127
2025	77,695	77,573	91,556
2026	79,078	78,938	95,117
2027	80,486	80,328	98,817
***Source: City of San Marcos, January 1, 2017 Population Estimate**			
Methodology – Enter total population from Estimated Population Table and apply the growth rate over 10 years			

Table: Ten-Year Population Projections
Wastewater Service Areas

Year	Wastewater Service Area Conservative Growth 1.78%	Wastewater Service Area Current Year Growth 1.76%	Wastewater Service Area Average Growth 3.89%
2017*	75,330	75,330	75,330
2018	76,671	76,656	81,305
2019	78,036	78,005	81,305
2020	79,425	79,378	84,467
2021	80,838	80,775	87,753
2022	82,277	82,197	91,167
2023	83,742	83,643	94,713
2024	85,232	85,115	98,398
2025	86,750	86,613	102,225
2026	88,294	88,138	106,202
2027	89,865	89,689	110,333
***Source: City of San Marcos, January 1, 2017 Population Estimate**			
Methodology – Enter total population from Estimated Population Table and apply the growth rate over 10 years			

Land Use Projections

To project growth of all land uses, it is assumed that the future acreage required to support the increased population will be consistent with acreage for existing uses

The following table indicates the acreage required of all land uses to support the future population increase.

Table: 2027 Land Use Projections
Water Service Area

Land Use Category	Acres per 100 Persons	Acres Required for 80,486 Persons
Single Family Residential	10.04	8,084
Multifamily Residential	2.93	2,356
Mixed Use	1.70	1,371
Commercial	5.16	4,156
Industrial	2.29	1,841
Public / Institutional	7.91	6,364
TOTAL DEVELOPED LAND		24,172
PERCENT DEVELOPED		38.8%

Methodology – Enter Acres per 100 Persons from Existing Land Use Table
Projected population/100* Acres per 100 persons = Acres Required
To determine percent developed, use the total acreage for the service area

Table: 2027 Land Use Projections
Wastewater Service Area

Land Use Category	Acres per 100 Persons	Acres Required for 89,865 Persons
Single Family Residential	10.04	9,026
Multifamily Residential	2.93	2,631
Mixed Use	1.70	1,531
Commercial	5.16	4,640
Industrial	2.29	2,055
Public / Institutional	7.91	7,106
TOTAL DEVELOPED LAND		26,989
PERCENT DEVELOPED		24.0%

Methodology – Enter Acres per 100 Persons from Existing Land Use Table
Projected population/100* Acres per 100 persons = Acres Required
To determine percent developed, use the total acreage for the service area

Total Build Out Population Projections

The total developed land within the Water Service Area is 24,172 acres which is approximately 39% built out. The total developed land within the Wastewater Service Area is 26,989 acres which is approximately 24% built out.

The following table documents the population projections for 100% build out.

Table: Total Build Out Population Projections
Water & Wastewater Service Area

	Water Service Area	Wastewater Service Area
2017 Population Estimate*	67,468	75,330
Percent Developed	38.8%	24.0%
Population at 100% Developed (Total Build Out)	173,885	313,875

*** Source: City of San Marcos, January 1, 2017 Population Estimate**
Methodology – Enter Estimated Population / Percent Developed

Summary & Findings

Summary

The data used to compile these Land Use Assumptions was obtained from the US Census Bureau, the City of San Marcos Planning & Development Services Department, the City of San Marcos Comprehensive Plan and assumptions made regarding known and anticipated development. The ten-year growth projections were calculated based upon historical trends in population growth, coordination with the State Demographer and anticipated development projects within the City's service areas. Total build out scenarios were based upon existing, similar development patterns.

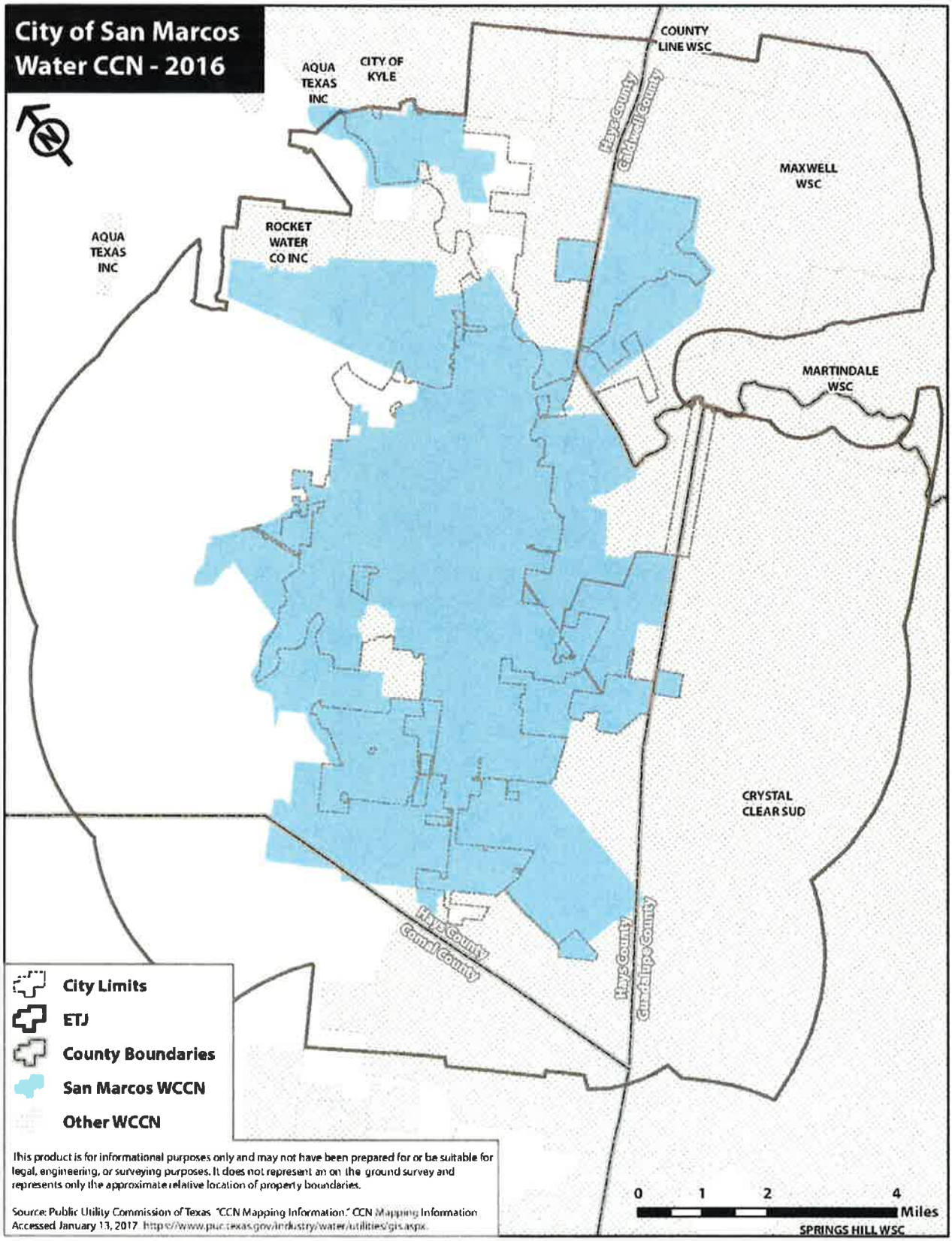
Findings

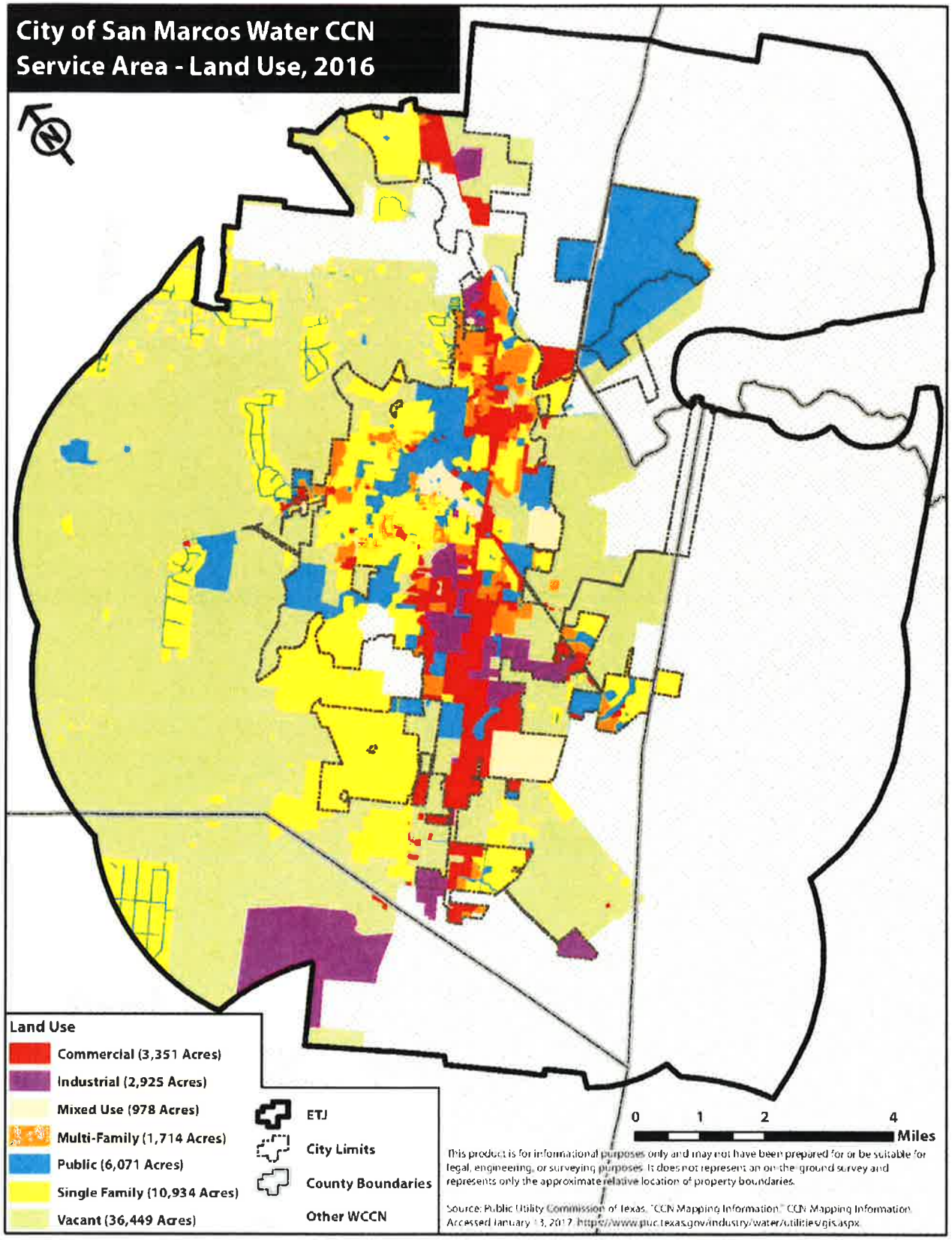
The land use assumptions discussed in this report may be summarized as follows:

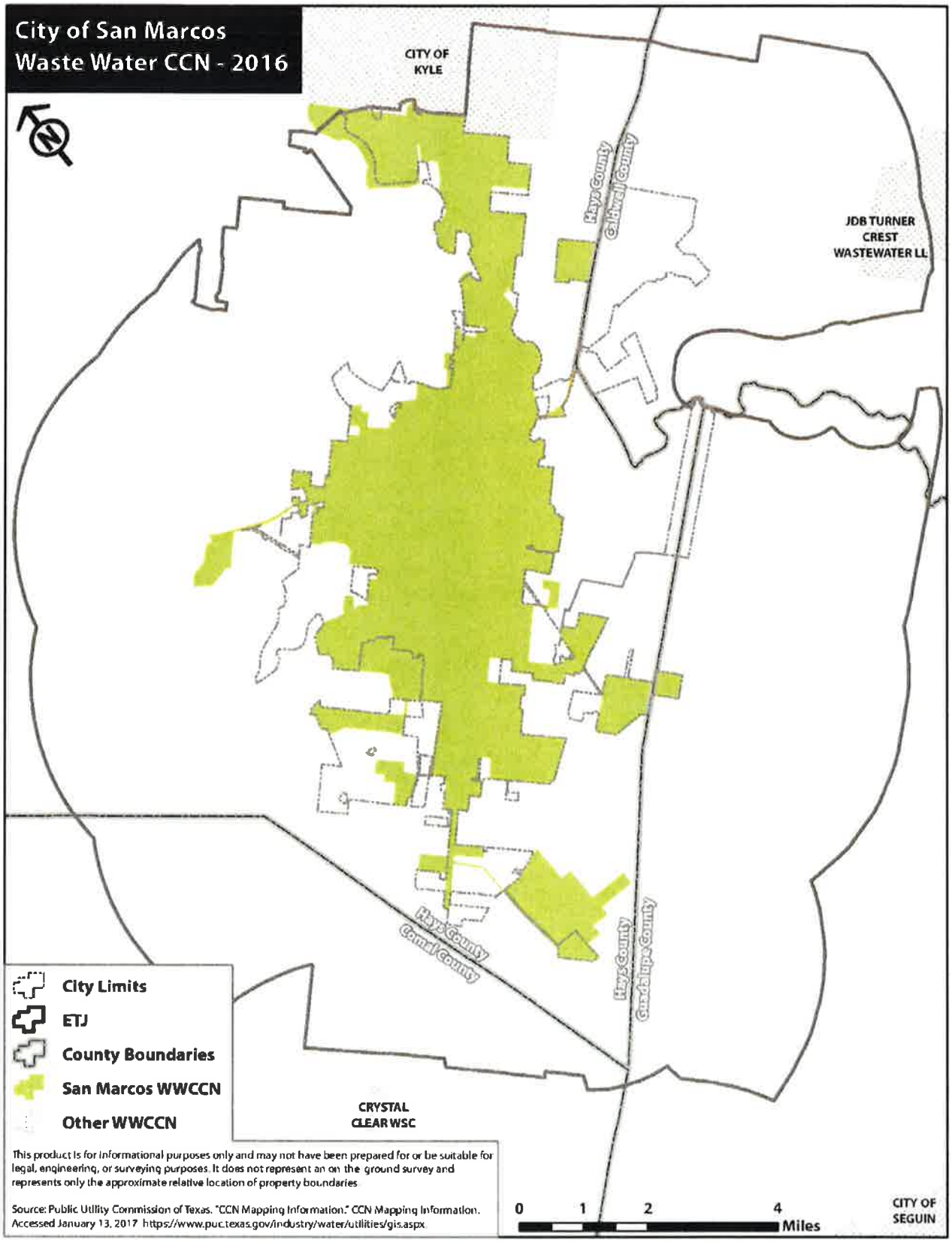
- Water Service Area Findings
    - The water impact fee service area contains approximately 62,354 acres of land.
    - Approximately 24,172 acres, or 38.8%, of the service area is developed.
    - The current population estimate for the water service area is 67,468.
    - Using the conservative, 1.78% growth rate, established with the Comprehensive Plan, the ten-year population projection for the water service area is 80,486 persons.
    - The total build out population for the water impact fee service area is 173,885.

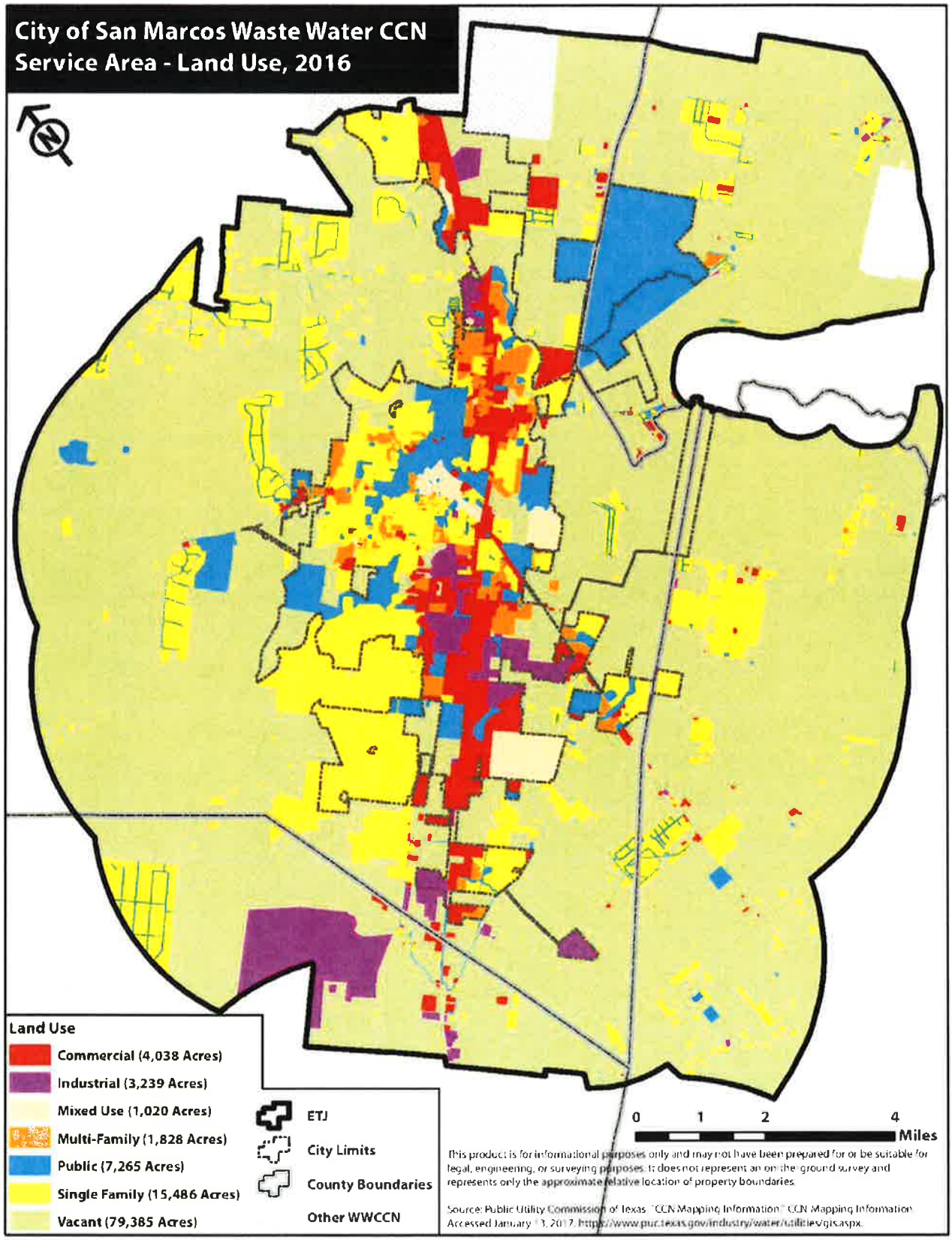
- Waste Water Service Area Findings
    - The waste water impact fee service area contains approximately 112,306 acres of land.
    - Approximately 26,989 acres, or 24.0%, of the service area is developed.
    - The current population estimate for the water service area is 75,330.
    - Using the conservative, 1.78% growth rate, established with the Comprehensive Plan, the ten-year population projection for the water service area is 89,865 persons.
    - The total build out population for the water impact fee service area is 313,875.

APPENDIX


City of San Marcos
Water CCN - 2016
AQUA TEXAS INC
CITY OF KYLE
COUNTY LINE WSC
Hays County
Caldwell County
MAXWELL WSC
AQUA TEXAS INC
ROCKET WATER CO INC
MARTINDALE WSC
CRYSTAL CLEAR SUD
Hays County
Comal County
Hays County
Guadalupe County
City Limits
ETJ
County Boundaries
San Marcos WCCN
Other WCCN
This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on the ground survey and represents only the approximate relative location of property boundaries.
Source: Public Utility Commission of Texas. "CCN Mapping Information." CCN Mapping Information Accessed January 13, 2017. http://www.puc.texas.gov/industry/water/utilities/gis.aspx.
0 1 2 4 Miles
SPRINGS HILL WSC


City of San Marcos Water CCN
Service Area - Land Use, 2016
Land Use
Commercial (3,351 Acres)
Industrial (2,925 Acres)
Mixed Use (978 Acres)
Multi-Family (1,714 Acres)
Public (6,071 Acres)
Single Family (10,934 Acres)
Vacant (36,449 Acres)
ETJ
City Limits
County Boundaries
Other WCCN
0 1 2 4
Miles
This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.
Source: Public Utility Commission of Texas, "CCN Mapping Information," CCN Mapping Information. Accessed January 13, 2017. http://www.puc.texas.gov/industry/water/utilities/gis.aspx


City of San Marcos
Waste Water CCN - 2016
CITY OF KYLE
Hays County
Caldwell County
JDB TURNER CREST WASTEWATER LL
Hays County
Comal County
Hays County
Guadalupe County
CRYSTAL CLEAR WSC
CITY OF SEGUIN
City Limits
ETJ
County Boundaries
San Marcos WWCCN
Other WWCCN
This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on the ground survey and represents only the approximate relative location of property boundaries.
Source: Public Utility Commission of Texas. "CCN Mapping Information." CCN Mapping Information. Accessed January 13, 2017. https://www.puc.texas.gov/industry/water/utilities/gis.aspx
0 1 2 4 Miles


City of San Marcos Waste Water CCN Service Area - Land Use, 2016
Land Use
Commercial (4,038 Acres)
Industrial (3,239 Acres)
Mixed Use (1,020 Acres)
Multi-Family (1,828 Acres)
Public (7,265 Acres)
Single Family (15,486 Acres)
Vacant (79,385 Acres)
ETJ
City Limits
County Boundaries
Other WWCCN
0 1 2 4
Miles
This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.
Source: Public Utility Commission of Texas "CCN Mapping Information" CCN Mapping Information Accessed January 13, 2017. http://www.puc.texas.gov/industry/water/utilities/gis.aspx.

Appendix B
City of San Marcos
Evaluation of Service Unit Equivalency

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS • DESIGNERS • SCIENTISTS

TECHNICAL MEMORANDUM

City of San Marcos
Evaluation of Service Unit Equivalency

Project No.: 0600-018-01

Date: March 19, 2014

Prepared For: Laurie Moyer, P.E.

Prepared By: Stephen J. Coonan, P.E. TX PE 65516

INTRODUCTION

The City of San Marcos (City) owns and operates water and wastewater utilities to provide critical service to customers within its service area. The City is experiencing significant growth within its utility service area. The significant growth in the service area poses a challenge to the City in terms of planning and implementing improvements to add capacity to the utility systems and maintain reliable service to all of its customers.

The City has adopted a policy whereby the City looks to the future customers of the system to fund the improvements required to provide service to them. These costs are allocated to future customers through the assessment of an Impact Fee that is collected at the time new customers connect to the system. The City utilizes the concept of Service Unit Equivalents (SUE) to be able to compare the different impacts of widely varying future customers. The City established that one SUE is equal to the anticipated impact from one new single-family residential connection.

The methodology to determine the number of SUEs for a given development was recently called into question following the approval of a large multi-family development that included over 700 bedrooms. Using the current methodology, this development was assessed an impact fee based on 50 SUEs. Since the typical single-family residence has three bedrooms, 50 single-family residences would only have 150 bedrooms. This discrepancy raised the concern that the City is under estimating the impact of multi-family developments, and therefore under collecting impact fees from these developments.

The City retained Alan Plummer Associates, Inc. to conduct an evaluation of the existing methodology to determine the number of SUEs in a development. This Technical Memorandum presents the results of that evaluation.

EXISTING METHODOLOGY

Currently, when a development is submitted to the City for review, the City requires the Developer to determine the peak water demand for the development. This is generally done by conducting a fixture unit count for the development in accordance with the American Water Works Association (AWWA) methodology. This methodology assigns a number of fixture units to each water using fixture, such as toilets, showers, sinks, hose bibs, and washing machines. The anticipated peak demand for the development can then be determined based on the following graph.

28 SIZING WATER SERVICE LINES AND METERS

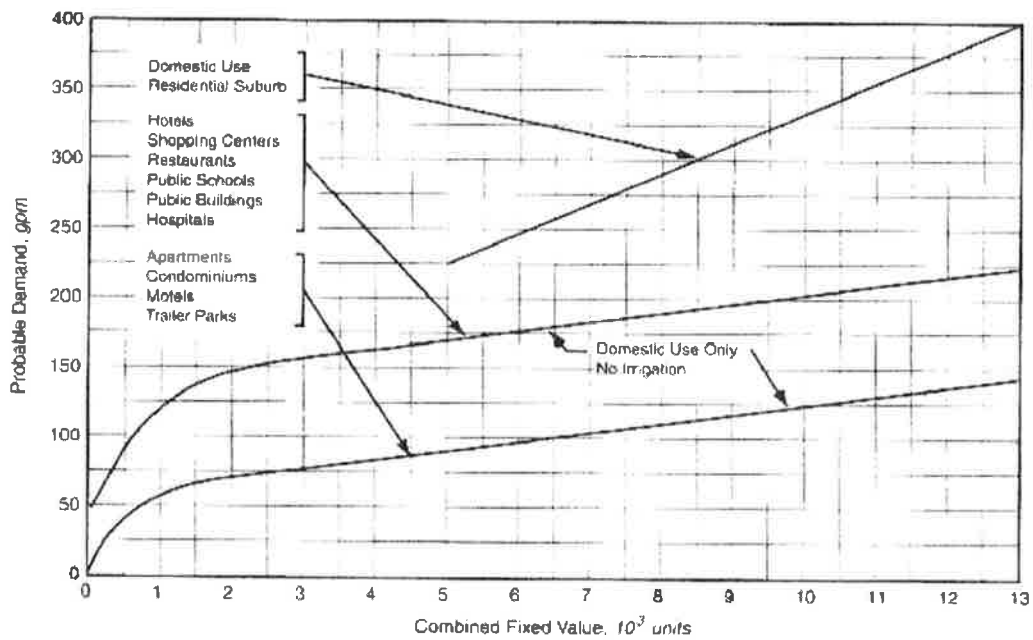


Figure 4-3 Water flow demand per fixture value—high range

As seen in the graph, the anticipated peak demand per fixture unit decreases as the total number of fixture unit increases. This is in recognition of the fact that the probability of every fixture being in operation at the same time decreases as the number of fixtures increases. Once the peak demand is established, a meter with the appropriate capacity for the development is selected. The number of SUEs for the project is based on the meter selected, as identified in the following table.

Meter Size	Peak Flow (gpm)	Service Unit Equivalent
5/8"	10	1
3/4"	15	1.5
1"	25	2.5
1-1/2"	50	5
2"	80	8
3"	160	16
4"	250	25
6"	500	50
8"	800	80

METHODOLOGY CONCERNS

As previously indicated, there is a concern that the current methodology is under estimating the impact of multi-family and commercial developments within the city. A quick analysis of the amount of water used on a monthly basis would tend to support this contention. The average single-family residence uses approximately 350 gallons per day per the Water Master Plan. The previously referenced multi-family development with over 700 bedrooms saw monthly demands on the order of 100,000 gallons. This would indicate that the water consumption of the multi-family development is 290 times that of a single-family residence, as opposed to 50 times. This apparent discrepancy is likely due to the difference in the probability that all fixtures in a single-family residence are in use versus the probability that all of the fixtures in the multi-family development are in use at the same time.

SYSTEN OPERATION AND DESIGN

Transmission and distribution lines are not designed based on the impact of a single user. They are designed based on the combined impact of all users within a given area. For a residential development, the water lines are not designed based on adding up the capacity of all the meters within the area. They

are designed to meet the peak demand anticipated given the probability that not all of the residents will be using water at the same time. Based on this realization, the design of small residential lines are likely to experience a higher percentage of customers using water at the same time. Major distribution lines serve much larger areas and would see a smaller percentage of customers using water at the same time. Transmission mains serve large portions of the city. As a result, the impact that any one residence or one multi-family development has on the capacity of major distribution and transmission mains is not equivalent to the maximum capacity of the meter.

ALTERNATIVE METHODOLOGY

Several years ago, the City implemented an automated meter reading (AMR) program. The AMR system allows the collection of meter data remotely via electronic signals. Meter data are available across the entire city on an hourly basis. Due to the extensive data available, it is possible to determine what the cumulative impact of customers is on the system.

Hourly meter data were collected for the months of August 2011, 2012 and 2013. August was selected as being representative of the highest demand period. The data were separated by customer type, meter type, and meter size. The average hourly demand for all meters within a given category was determined for all 744 hours of the month for each year. Next, the maximum hourly demand for each year for each category was determined and expressed in terms of gallons per minute. Finally, the average peak demand of the three years was determined. The following table contains the results of that analysis for meter sizes and types where there were at least 10 meters in the system for a given use.

City of San Marcos
Evaluation of Service Unit Equivalency

City of San Marcos - Service Unit Equivalents

Customer Class	Meter Size / Type	Aug 2011 (gpm)			Aug 2012 (gpm)			Aug 2013 (gpm)			Average		Service Unit Equivalent
		No. of Accounts	Peak Demand	Peak Hour σ	No. of Accounts	Peak Demand	Peak Hour σ	No. of Accounts	Peak Demand	Peak Hour σ	Peak Demand	σ	
Residential	5/8" SR	5,616	0.47	1.44	6,153	0.39	1.26	6,660	0.35	1.14	0.41	1.28	1.00
Residential	3/4" SEAL	92	1.51	4.62	102	1.06	3.88	124	0.68	2.59	1.08	3.70	2.67
Residential	1" SEAL	21	3.48	8.48	28	2.20	6.36	35	1.69	6.32	2.46	7.05	6.06
Commercial	5/8" SEAL	1,419	0.49	1.48	1,599	0.37	1.22	1,768	0.32	1.01	0.40	1.24	0.97
Commercial	3/4" SEAL	22	3.06	5.69	25	1.95	3.94	36	1.11	2.35	2.04	4.00	5.03
Commercial	1" SEAL	158	1.45	8.83	185	0.74	1.42	240	0.71	1.61	0.97	3.95	2.38
Commercial	1-1/2" SEAL	71	2.44	8.04	73	1.96	4.37	86	1.82	5.27	2.07	5.89	5.11
Commercial	2" CMPD	111	4.77	25.42	123	3.18	7.84	154	2.84	6.37	3.59	13.21	8.86
Commercial	3" CMPD	34	12.65	15.60	34	10.34	12.68	42	11.41	16.96	11.47	15.08	28.27
Commercial	4" CMPD	13	39.60	74.79	20	27.23	47.45	26	19.89	41.72	28.91	54.65	71.26
Commercial	6" CMPD	8	25.97	38.74	9	61.67	39.43	11	39.22	59.08	42.29	45.75	104.25
Comm - Irrigation	5/8" SEAL	25	1.89	6.40	35	1.57	4.34	44	1.63	4.59	1.70	5.11	4.19
Comm - Irrigation	3/4" SEAL	23	2.62	7.01	29	2.47	6.07	34	2.03	5.52	2.37	6.20	5.85
Comm - Irrigation	1" SEAL	48	3.86	12.48	56	4.80	11.16	61	3.11	9.16	3.93	10.93	9.68
Comm - Irrigation	1-1/2" SEAL	10	13.82	21.36	12	11.78	18.09	13	14.80	19.53	13.47	19.66	33.20
Comm - Irrigation	1-1/2" TURBO	18	17.16	22.23	21	15.93	27.56	24	14.12	25.55	15.74	25.11	38.80
Comm - Irrigation	2" TURBO	55	19.35	35.56	69	22.68	33.42	79	18.31	29.67	20.11	32.88	49.58

It is important to note that multi-family is not a discrete use. It is possible that some of the ¾-inch and 1-inch residential meters are actually duplex installations. Some of the larger meters identified as commercial use are certainly multi-family complexes. It is interesting to note that a natural progression from a 5/8-inch meter to a 1-1/2-inch commercial meter is not observed. This is quite likely due to uncertainty concerning the use and the appropriate meter size for these smaller commercial users. It is also interesting to note that irrigation meters experienced higher peak demands than similarly sized meters employed in commercial applications.

Commercial Meter Installations

Meter Size	Meter Design Peak Flow (gpm)	Observed Cumulative Peak (gpm)	Service Unit Equivalent
5/8" Seal	10	0.4	1
3/4" Seal	15	2.0	5.0
1" Seal	25	1.0	2.4
1-1/2" Seal	50	2.1	5.1
2" CMPD	80	3.6	8.9
3" CMPD	160	11.5	28.3
4" CMPD	250	28.9	71.3
6" CMPD	500	42.3	104.2

Irrigation Meter Installations

Meter Size	Meter Design Peak Flow (gpm)	Observed Cumulative Peak (gpm)	Service Unit Equivalent
5/8" Seal	10	1.7	4.2
3/4" Seal	15	2.4	5.8
1" Seal	25	3.9	9.7
1-1/2" Seal	50	13.5	5.1
1-1/2" Turbo	50	15.7	8.9
2" Turbo	80	20.1	28.3

This analysis indicates that the Service Unit Equivalents the City has been assessing for commercial and residential developments appear to be reasonable for projects that use a 2-inch meter or smaller. However, it also appears as though the City has been under assessing developments with larger meters

as well as irrigation only meters. The City may wish to increase the number of Service Unit Equivalents charged for meters larger than 2-inches as well as irrigation only meters based on the numbers indicated in the tables above. The smaller meters can remain the same.

Appendix C
City of San Marcos
2017 Determination of Number of Water LUEs

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

TECHNICAL MEMORANDUM

August 2017 Metersense Water Interval Data
City of San Marcos

Project No.: 0600-018-01

Date: December 18, 2017

Prepared For: Laurie Moyer, P.E.

Prepared By: Stephen J. Coonan, P.E. (TX No. 65516)

INTRODUCTION

The City of San Marcos provides water and wastewater service to customers within its service area. The City is experiencing continued strong growth, requiring that the City construct improvements to the water and wastewater system to meet the growing demand. The City has a policy of collecting Impact Fees from new developments to offset a portion of the cost of providing service to the new customers. Historically, the Impact Fee was assessed based on the number of Service Unit Equivalents (SUE) assumed based on the size of the water meter installed with the new development. The City previously retained Alan Plummer Associates, Inc. (APAI) to conduct an evaluation of this policy.

As demonstrated in the attached Memorandum, the result of that analysis showed that the use of the water meter size was under estimating the impact that new developments had on the water system. The under estimation was the result of two factors: first, the capacities of water meters have increased for a given size over the years resulting in more flow and more SUEs being served; second, the comparison of the capacity of a larger meter to the capacity of a single-family meter did not appropriately consider the differences in the probability of peak demands actually occurring. As an example, a new development with a six-inch meter and a peak flow of 500 gallons per minute (gpm) would be determined to have 50 SUEs. However, the likelihood that 50 single-family residences would ever have a combined demand of 500 gpm is very low.

The previous analysis completed by APAI indicated that when considering the likelihood of coincidental peak demands, the average single family residential customer has a demand of 0.4 gpm. Based on this analysis, it was recommended that the City redefine the calculation of the number of SUEs by dividing the peak calculated demand by 0.4 gpm.

As part of the process of updating the City's Impact Fee ordinance, it is necessary to determine how many SUE's the City is currently serving as this is used in determining the cost of serving existing customers versus the cost of serving new customers. Previously, the City would base the estimate on the number and size of meters in the system. However, based on the previous recommendation to change the definition of an SUE to be 0.4 gpm of peak demand, it is appropriate to use a different approach in determining the number of SUEs currently being served. This Technical Memorandum provides a description of the revised methodology to be used for this analysis as well as future analyses.

EVALUATION METHODOLOGY

The City implemented a complete change to Smart Meters for all of its water customers. As a result, the City can produce hourly data for all meters within its system for any given hour. In the previous analysis, it was determined that the month of August was typically the month where the peak water demand occurred. The City provided APAI with hourly demands for each meter in the system for the month of August 2017.

DATA ANAMOLIES

These records were reviewed for reasonableness. Four suspect data points were identified in this process. The data indicated that one meter showed use of 200,768 gallons between 2 and 3 a.m. on the 2nd and 16th of the month. The use for all other hours on those days was 0. In addition, the total use of all other meters for those hours was approximately 250,000 gallons. A second meter showed use of 353,000 gallons between 7 and 8 a.m.on the 25th. The data showed use for the hours surrounding this data point were less than 500 gallons. In addition, the total use shown for all other meters during this hour was 204,000 gallons. Finally, a third meter showed use of 457,000 gallons between 3 and 4 a.m. on the 28th with no use being shown for the rest of the day. The total use shown for all other meters during this hour was 164,000 gallons.

City staff was contacted about these anomalies and it was determined that the readings were obviously erroneous and therefore were removed from the data set.

DATA ANALYSIS

The following table contains a summary of the daily water demands for the month of August 2017 as well as the peak hour demand.

Table 1: Summary data for the month of August

Date	Active Meters	Average Hourly Demand (Gal)	Peak Hour	Peak Hour Total Demand (Gal)	Peak Hour Demand (gpm)
1-Aug	11,024	285,461	22	357,283	5,955
2-Aug	11,011	272,540	23	338,026	5,634
3-Aug	11,011	265,602	22	323,671	5,395
4-Aug	11,009	270,684	23	355,583	5,926
5-Aug	11,016	248,286	21	291,464	4,858
6-Aug	11,013	233,166	21	303,768	5,063
7-Aug	11,011	236,994	22	345,611	5,760
8-Aug	11,009	235,811	23	289,289	4,821
9-Aug	11,013	237,981	22	282,187	4,703
10-Aug	11,011	244,237	22	305,035	5,084
11-Aug	11,005	249,773	23	312,973	5,216
12-Aug	11,006	232,298	21	275,160	4,586
13-Aug	11,005	232,096	21	286,022	4,767
14-Aug	11,005	271,626	23	362,936	6,049
15-Aug	11,005	269,368	1	351,164	5,853
16-Aug	10,996	258,597	22	327,356	5,456
17-Aug	11,001	256,822	22	311,777	5,196
18-Aug	11,000	267,722	23	352,478	5,875
19-Aug	11,001	242,841	21	290,495	4,842
20-Aug	10,993	237,332	21	307,847	5,131
21-Aug	10,993	272,501	22	365,925	6,099
22-Aug	10,990	269,309	1	338,061	5,634
23-Aug	10,994	225,665	22	306,045	5,101
24-Aug	11,006	244,064	22	292,666	4,878
25-Aug	11,012	245,144	22	288,636	4,811
26-Aug	10,989	201,460	23	292,309	4,872
27-Aug	10,985	198,735	13	254,686	4,245
28-Aug	10,985	232,407	22	307,484	5,125
29-Aug	10,986	223,871	22	292,108	4,868
30-Aug	10,985	222,657	22	288,652	4,811
31-Aug	10,988	217,667	22	276,609	4,610

DATA SUMMARY

- On average the highest demand hours are between 9pm (21st hour) and 1am (1st hour).
- The peak hour demand occurred on 21st August at 10pm (22nd hour), at a value of 365,925 gallons (6,099 gpm).
- The average hourly demand for August was 245,249 gallons.
- The average daily total demand for August was 5,885,974 gallons.
- The highest total daily demand was 6,851,074 gallons on the 1st of August
- During August the range for total demand stayed between 4,769,639 and 6,851,074 gallons.

SERVICE UNIT EQUIVALENTS

As previously indicated, the City has defined one SUE to be 0.4 gpm. Therefore to determine the total number of SUEs in the system as of August 2017, the peak hour demand of 6,099 gpm by 0.4 results in a total of 15,247 SUEs.

FUTURE CALCULATIONS

In the future when the City wants to determine the number of SUEs that it is serving, it is recommended that the same methodology be used; namely, that the water consumption data from the smart meters be used to determine the peak hour demand that occurred in the most recent month of August. The data should be verified to identify any obvious outliers and then the peak hourly demand (expressed in gpm) be divided by 0.4 gpm.

Appendix D
Summary of 10-Year Water & Wastewater CIP Projects

Water Capital Projects	***Cost***
WATER SUPPLY	
Alliance Regional Water Authority	$75,405,000
WATER PUMPING	
Comanche Pump Station Improvements	180,000
SWTP Pump Expansion	0
Trunk Hill Pumps	2,500,000
Soyars Storage Tank Pumps	65,000
ELEVATED STORAGE	
Trunk Hill Tank	1,790,000
La Cima Tank Oversizing	215,500
TRANSMISSION	
Southeast Improvements	12,065,000
Northeast Improvements	4,800,000
Central Improvements	3,500,000
Southwest Improvements	733,000
Total 10-Year Projects for Growth	**$101,253,500**

Wastewater Capital Projects	***Cost***
WASTEWATER TREATMENT	
Existing WWTP 4.0 MGD AADF Expansion	$20,500,000
PUMPING (Lift Stations)	
Brown Terrance Wastewater Lift Station	50,000
Hwy 80 Lift Station and Force Main	6,000,000
Trace Lift Station Oversize	3,200,000
Main Lift Station Improvements	6,200,000
Main Lift Station Force Main	4,700,000
INTERCEPTORS	
Southeast Improvements	800,000
Northeast Improvements	17,400,000
Central Improvements	500,000
Southwest Improvements	1,725,000
Total 10-Year Projects for Growth	**$61,075,000**

Appendix E
LUE Fee Conversion Table

Calculated Peak Flow (gpm)	Living Units Equivalent (LUEs) per Meter (a)	Maximum Base Fee per 5/8" Meter (b)	Maximum Impact Fee by Meter Size
WATER UTILITY			
0 - 10	1.0	**$3,801**	$3,801
>10 – 15	2.0		7,602
>15 - 25	4.0		15,204
>25 – 50	6.0		22,806
>50 – 80	8.5		32,309
>80 – 160	32.5		123,533
>160 – 250	64.5		245,165
>250 – 500	104.0		395,304
>500	150.0		570,150
WASTEWATER UTILITY			
0 - 10	1.0	**$2,684**	$2,684
>10 – 15	2.0		5,368
>15 - 25	4.0		10,736
>25 – 50	6.0		16,104
>50 – 80	8.5		22,814
>80 – 160	32.5		87,230
>160 – 250	64.5		173,118
>250 – 500	104.0		279,136
>500	150.0		402,600

(a) Derived "City of San Marcos Evaluation of Service Unit Equivalency" Technical Memorandum dated April 29, 2016 by Alan Plummer Associates, Inc.

(b) Based on maximum fee presented to Impact Fee Advisory Committee on 1/23/18.